

Solar Heliosphere Group

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PREAMBLE

The closely coupled system of the Sun and the Heliosphere controls the environment of the Earth, Moon, Mars, other planets, and smaller bodies in the solar system. Solar imaging (including spectroscopy) provides the primary and most comprehensive way to study the Sun. Concepts exist for carrying out in situ measurements as close as four solar radii to Sun-center. Promising new techniques are being developed for imaging of the Heliosphere and its interaction with the surrounding interstellar medium. The combination of solar and heliospheric imaging with in situ measurements is essential to provide an understanding of the physics of the solar/heliosphere coupling, of heliosphere/interstellar medium interaction, and also of the solar-heliosphere coupling to the environments of planetary and smaller bodies in the solar system. Here we have organized the solar-heliosphere imaging discussions, beginning with the major scientific objectives and tracing down to the required measurements and imaging technology. Of particular interest to the Exploration Initiative are the hazards to humans in this environment, and how to predict them. We have ordered the discussion beginning with those scientific objectives relevant to this topic.

The following discussion is based on the assumption that STEREO, Solar-B and SDO will be completed. Those missions will make key contributions to improving our knowledge, understanding and predictive capability of solar-heliospheric events. In the following discussion we address important issues that cannot be adequately addressed by those missions.